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# Washington

## Basin Outlook Report

### March 1, 1993





# Basin Outlook Reports

## and Federal - State - Private Cooperative Snow Surveys

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### *How forecasts are made*

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

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# Washington Water Supply Outlook

March 1993

## General Outlook

MARCH 1, 1993: Major changes in the weather have occurred since the first of January, with cold and dry being the norm. February precipitation was 20% of normal state wide, and varied from 56% of average in the Walla Walla Basin to 5% in the North Puget Basin. Year-to-date precipitation varies from 88% in the Walla Walla to 61% in the North Puget Basin. Forecasts for 1993 runoff vary from 106% of average for the Grande Ronde River to 59% for the Similkameen River. The snowpack varies from 57% in the Olympic Basin to 122% in the Walla Walla Basin. Washington SNOTEL sites averaged 86% of normal snowpack on March 1, Down from 105% on February 1 (By March 8, the statewide average was 87%). February temperatures were below normal and varied from one degree below in the White-Green Basin to 11 degrees below in the Walla Walla Basin. With the below normal temperatures in February, streamflows varied from 91% of normal on the Kettle River to 21% on the Walla Walla River. March 1 reservoir storage is generally poor throughout the state, with reservoirs in the Yakima Basin at 38% of average and 25% of capacity.

## Snowpack

The March 1 SNOTEL reading showed the snowpack to be 86% of average. Snowpack continues to vary over the state. The Colville River Basin had 108% of average, and the Walla Walla Basin had the highest with 122% of normal. The North Puget River Basins had 62% of average. The Olympic Peninsula rivers were the lowest with 57% of normal. Snowpack along the east slopes of the Cascade Mountains includes the Yakima with 76% down from 95% last month, and the Wenatchee 73%, down from 89%. Snowpack in the Okanogan is at 85%, down from 98%, and the Spokane Basin at 90%, down from 108%. Maximum snow cover is at Paradise on Mount Rainier, with a water content of 45.2 inches. This site would normally have 47.9 inches of water content on March 1.

## Precipitation

February precipitation reported from National Weather Service stations was 20% of average statewide. The year-to-date precipitation statewide is 72% and varied from 88% of normal in the Walla Walla Basin, to 61% in the North Puget Basin. February precipitation varied from 5% of average in the North Puget Basin, to 88% in the Walla Walla Basin. SNOTEL sites in Washington showed high elevation year-to-date precipitation values to be 72%. Maximum year-to-date precipitation was at the June Lake SNOTEL site near Mt. St. Helens, with 75.1 inches since October 1, 1992; normal for this site is 99.4 inches.



## Reservoir

Reservoir storage in Washington is much below average for March 1. Cold weather has reduced the streamflow entering the reservoirs. Reservoir storage in the Yakima Basin was 261,500 acre feet, 38% of normal. Storage at other reservoirs include Roosevelt at 94% of average, and the Okanogan reservoirs at 92% of normal for March 1. The power generation reservoirs contain the following: Coeur d'Alene Lake, 39,600 acre feet, or 27% of normal; Chelan Lake, 160,500 acre feet, 95% of average and 24% of capacity, and Ross Lake at 197% of average, and 43% of capacity.

## Streamflow

February streamflows were below average in Washington. The Kettle River at 91% was the highest and the South Fork Walla Walla River with 21%, was the lowest in the state. Other streamflows were the following percentage of normal: the Lewis River, 28%; the Okanogan River, 61%; the Spokane River, 36%; the Columbia at the Canadian border, 64%,. and the Yakima River at Kiona, 47%. Forecasts for summer streamflow are for much below-to-near average and vary from 106% of average for the Grande Ronde River to 59% of normal for the Similkameen River. March forecasts for some west side streams include: Cedar River, 83%; Green River, 81%; and the Dungeness River, 75%. Some east side streams include the Yakima River at Parker, 67%; the Stemilt, 83%; the Chelan River, 70% and the Colville River, 81%.

## Other

Some water saving hints have been enclosed near the end of the bulletin for irrigators and ranchers

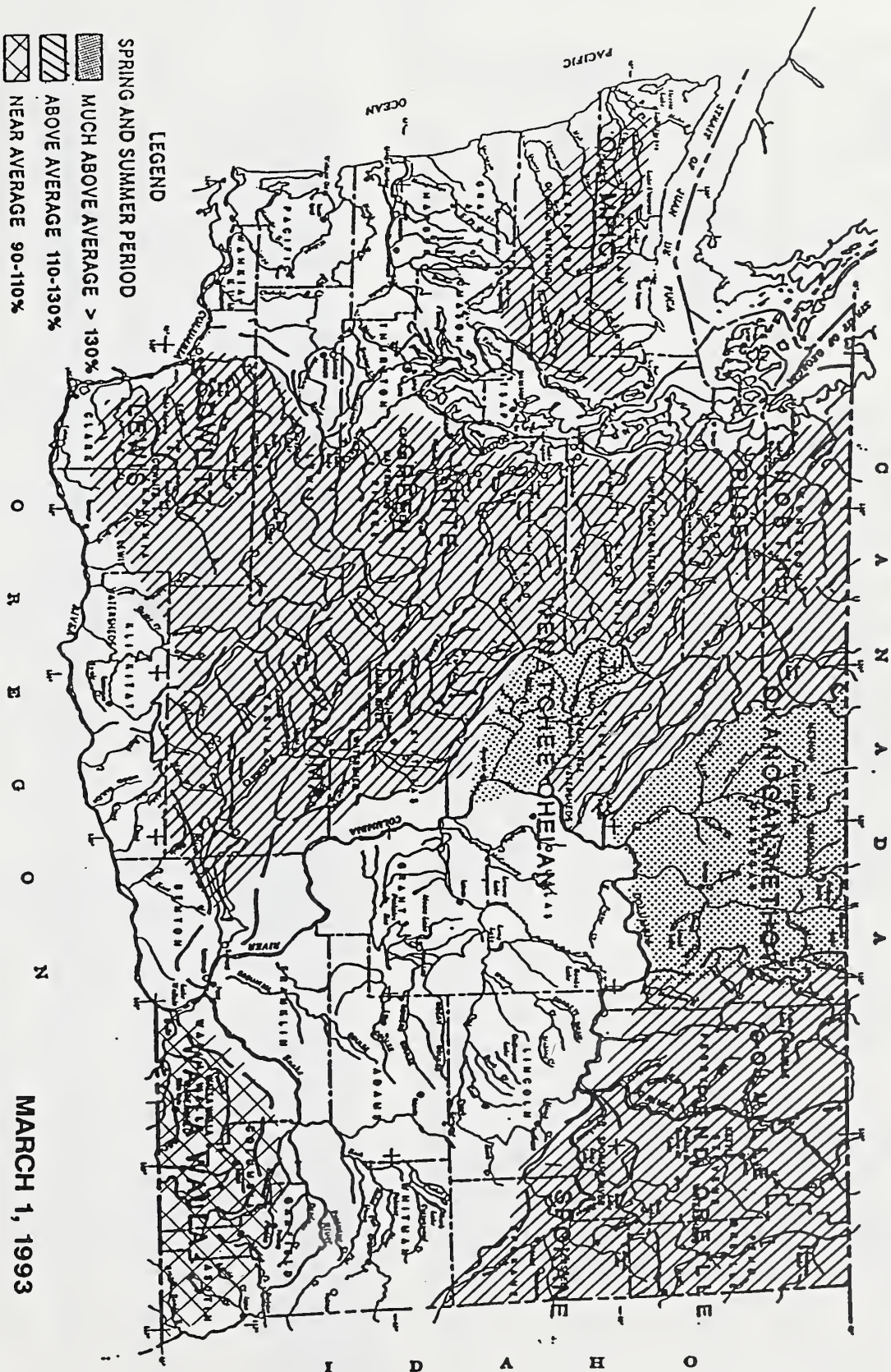
*For more information contact your local Soil Conservation Service office.*

- LEGEND**
- SPRING AND SUMMER PERIOD**
- MUCH ABOVE AVERAGE > 130%
  - ABOVE AVERAGE 110-130%
  - NEAR AVERAGE 90-110%
  - BELOW AVERAGE 70-90%
  - MUCH BELOW AVERAGE < 70%
  - NOT FORECAST
  - WATERSHED BOUNDARY

**MARCH 1, 1993**

**STREAMFLOW PROSPECTS**

**WASHINGTON**





# BASIN SUMMARY OF SNOW COURSE DATA MARCH 1993

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90
PEND OREILLE RIVER							YAKIMA RIVER						
BENTON MEADOW	2370	2/25/93	28	8.1	.0	5.9	ANTANUM R.S.	3100	3/01/93	34	11.2	2.4	6.8
BENTON SPRING	4920	2/25/93	46	14.2	12.8	16.7	BLEWETT PASS#2PILLOW	4270	3/01/93	---	11.2S	10.4	17.0
BOYER MOUNTAIN	5250	2/25/93	56	17.2	17.7	21.6	BUMPING LAKE	3450	2/24/93	31	10.1	6.8	14.0
BUNCHGRASS MEADOWS	5000	2/25/93	64	16.8	22.5	26.6	BUMPING LAKE (NEW)	3400	2/24/93	36	12.4	8.6	17.6
BUNCHGRASS MDWPILLOW	5000	3/01/93	---	16.9	21.5	22.7	BUMPING RIDGE PILLOW	4600	3/01/93	---	17.2E	17.9	18.4
CHEWALAH	4930	2/25/93	50	13.4	13.0	13.5	CAYUSE PASS	5300	3/01/93	---	53.8E	49.7	65.3
HOODOO BASIN	6050	3/01/93	---	28.8E	35.5	42.7	CORRAL PASS	6000	3/01/93	---	21.3S	27.5	27.6
HOODOO CREEK	5900	3/01/93	---	25.0E	31.5	39.2	FISH LAKE	3370	2/24/93	56	20.7	23.4	29.3
NELSON CAN.	3100	2/24/93	43	12.3	12.2	14.3	FISH LAKE PILLOW	3370	3/01/93	---	18.6S	21.0	28.4
KETTLE RIVER							GREEN LAKE	6000	3/01/93	63	23.7	19.3	29.1
BARNES CREEK CAN.	5300	2/25/93	54	17.3	18.2	17.2	GREEN LAKE PILLOW	6000	3/01/93	---	16.8S	14.4	17.5
BIG WHITE MTN CAN.	5510	2/26/93	50	14.6	14.9	16.3	GROUSE CAMP PILLOW	5380	3/01/93	---	12.5S	17.9	17.1
CARMI CAN.	4100	2/26/93	28	6.8	3.9	6.1	DOMMERIE FLATS	2200	2/23/93	15	5.6	.0	7.7
FARRON CAN.	4000	2/26/93	40	10.3	9.6	12.4	MORSE LAKE PILLOW	5400	3/01/93	---	31.7S	44.5	38.5
GOAT CREEK	3600	2/24/93	30	6.6	4.6	6.4	OLALLIE MDWS PILLOW	3960	3/01/93	---	31.4S	29.3	44.6
MONASHEE PASS CAN.	4500	2/25/93	40	12.4	12.2	12.2	OLALLIE MEADOWS	3630	3/01/93	34	16.9	12.1	38.7
SUMMIT G.S.	4600	2/24/93	39	8.8	7.3	7.1	SASSE RIDGE PILLOW	4200	3/01/93	---	24.0S	26.0	27.4
TRAPPING CK LOW CAN.	3050	2/28/93	20	5.3	2.8	5.1	STAMPEDE PASS PILLOW	3860	3/01/93	---	29.2S	30.0	38.2
COLVILLE RIVER							TUNNEL AVENUE	2450	2/23/93	40	13.9	5.0	19.2
CHEWALAH	4930	2/25/93	50	13.4	13.0	13.5	WHITE PASS ES PILLOW	4500	3/01/93	---	17.5E	14.4	20.7
TOGO	3370	2/26/93	41	11.2	6.8	9.3	ANTANUM CREEK						
OMAK LAKE, TWIN LAKES							ANTANUM R.S.	3100	3/01/93	34	11.2	2.4	6.8
SPOKANE RIVER							GREEN LAKE	6000	3/01/93	63	23.7	19.3	29.1
FOURTH OF JULY SUM	3200	2/23/93	42	11.6	.0	8.4	GREEN LAKE PILLOW	6000	3/01/93	---	16.8S	14.4	17.5
LOST LAKE (d)	6110	3/01/93	---	34.8E	43.5	47.2	MILL CREEK						
MOSQUITO RDG PILLOW	5200	3/01/93	---	22.5	30.9	32.2	HIGH RIDGE PILLOW	4980	3/01/93	---	25.0S	13.3	21.6
SUNSET	5540	2/25/93	58	18.6	22.9	30.8	TOUCHET #2 PILLOW	5530	3/01/93	---	27.6	21.9	27.8
SUNSET PILLOW	5540	3/01/93	---	21.0	28.5	32.0	LEWIS - COWLITZ RIVERS						
NEWMAN LAKE							CAYUSE PASS	5300	3/01/93	---	53.8E	49.7	65.3
QUARTZ PEAK PILLOW	4700	3/01/93	---	17.4	13.3	18.6	JUNE LAKE PILLOW	3200	3/01/93	---	43.1S	1.9	33.6
RAGGED RIDGE	3330	2/26/93	39	12.0	.0	7.4	LONE PINE PILLOW	3800	3/01/93	---	25.5S	14.1	28.1
OKANOGAN RIVER							PARADISE PARK PILLOW	5500	3/01/93	---	45.2S	54.1	47.9
ABERDEEN LAKE CAN.	4300	2/26/93	27	6.0	3.9	5.9	PIGTAIL PEAK PILLOW	5900	3/01/93	---	28.1E	38.6	41.0
BLACKWALL PEAK CAN.	6370	3/01/93	---	17.7	26.4	29.6	POTATO HILL PILLOW	4500	3/01/93	---	21.0S	15.8	21.9
BRENDA MINE CAN.	4800	2/25/93	39	10.3	8.5	11.9	SHEEP CANYON PILLOW	4050	3/01/93	---	35.8S	9.4	30.1
BROOKMERE CAN.	3200	2/26/93	20	4.7	4.6	8.0	SPENCER MDW PILLOW	3400	3/01/93	---	28.0S	8.4	27.2
ENDERBY CAN.	6200	2/27/93	78	25.6	28.7	32.6	SPIRIT LAKE PILLOW	3100	3/01/93	---	11.2E	.0	6.6
ESPERON CK. UP	5410	2/28/93	46	14.4	13.1	15.7	SURPRISE LKS PILLOW	4250	3/01/93	---	35.8S	27.4	37.5
FREEZEOUT CK. TRAIL	3500	2/26/93	23	7.2	7.3	11.1	WHITE PASS ES PILLOW	4500	3/01/93	---	17.5E	14.4	20.7
GREYBACK RES CAN.	5120	2/25/93	34	8.3	6.4	7.8	WHITE RIVER						
HAMILTON HILL CAN.	4890	2/28/93	37	10.7	10.2	13.7	CAYUSE PASS	5300	3/01/93	---	53.8E	49.7	65.3
HARTS PASS	6500	2/25/93	69	23.4	35.1	36.2	CORRAL PASS	6000	3/01/93	---	26.2E	---	33.9
HARTS PASS PILLOW	6500	3/01/93	---	23.5E	40.2	34.6	CORRAL PASS PILLOW	6000	3/01/93	---	21.3S	27.5	27.6
ISINTOK LAKE CAN.	5500	2/25/93	31	7.4	4.6	6.8	MORSE LAKE PILLOW	5400	3/01/93	---	31.7S	44.5	38.5
LIGHTNING LAKE CAN.	4000	2/27/93	24	6.8	9.1	11.9	GREEN RIVER						
LOST HORSE MTN CAN.	6300	3/01/93	29	6.7	6.5	8.1	COUGAR MTN. PILLOW	3200	3/01/93	---	15.8S	.0	18.6
MCCULLOCH CAN.	4200	2/23/93	32	8.2	4.3	6.4	GRASS MOUNTAIN #2	2900	3/02/93	16	7.2	.0	13.9
MISSEZULA MTN CAN.	5090	2/27/93	27	6.8	6.7	9.0	LESTER CREEK	3100	3/02/93	51	17.2	8.8	17.7
MISSION CREEK CAN.	5800	3/02/93	48	14.7	15.0	17.2	LYNN LAKE	4000	3/02/93	45	18.7	6.5	16.0
MONASHEE PASS CAN.	4500	2/25/93	40	12.4	12.2	12.2	SAWILL RIDGE	4700	3/02/93	57	21.8	16.8	29.7
MT. KOBAY CAN.	5900	2/27/93	39	10.9	9.3	10.7	STAMPEDE PASS PILLOW	3860	3/01/93	---	29.2S	30.0	38.2
MUTTON CREEK #1	5700	3/03/93	41	11.0	10.9	11.4	TWIN CAMP	4100	3/02/93	58	22.0	16.3	21.8
OYAMA LAKE CAN.	4400	2/27/93	30	7.4	4.2	6.1	CEDAR RIVER						
POSTILL LAKE CAN.	4500	2/26/93	33	7.2	6.1	7.4	CITY CABIN	2390	2/26/93	27	10.9	.0	12.3
RUSTY CREEK	4000	3/03/93	23	6.1	4.5	6.2	MT. GARDNER	3300	2/26/93	33	13.3	.0	14.2
SALMON MDWS PILLOW	4500	3/01/93	---	8.0S	9.4	8.3	SNOQUALMIE RIVER						
SILVER STAR MTN CAN.	6000	2/28/93	68	24.8	21.4	24.3	ALPINE MEADOWS	3500	2/26/93	82	36.9E	13.4	33.8
SUMMERLAND RES CAN.	4200	2/24/93	33	8.4	6.5	8.7	OLALLIE MDWS PILLOW	3960	3/01/93	---	31.4S	29.3	44.6
SUNDAY SUMMIT CAN.	4300	2/27/93	21	4.8	3.5	5.5	OLALLIE MEADOWS	3630	3/01/93	34	16.9	12.1	38.7
TROUT CREEK CAN.	4690	2/26/93	28	6.9	4.3	6.7	SKYKOMISH RIVER						
VASEUX CREEK CAN.	4600	2/26/93	24	5.7	5.0	5.9	STAMPEDE PASS PILLOW	3860	3/01/93	---	29.2S	30.0	38.2
WHITE ROCKS MTN CAN.	6000	3/01/93	49	15.4	18.4	20.0	STEVENS PASS PILLOW	4070	3/01/93	---	26.6S	32.6	34.7
METHOW RIVER							STEVENS PASS SAND SD	3700	2/26/93	57	20.3	22.0	31.1
HARTS PASS	6500	2/25/93	69	23.4	35.1	36.2	SKAGIT RIVER						
HARTS PASS PILLOW	6500	3/01/93	---	23.5E	40.2	34.6	BEAVER CREEK TRAIL	2200	2/27/93	37	12.5	1.7	12.6
MUTTON CREEK #1	5700	3/03/93	41	11.0	10.9	11.4	BEAVER PASS	3680	2/26/93	43	15.8	18.2	25.1
RUSTY CREEK	4000	3/03/93	23	6.1	4.5	6.2	BROWN TOP	6000	2/26/93	87	31.0	47.0	51.9
SALMON MDWS PILLOW	4500	3/01/93	---	8.0S	9.4	8.3	DEVILS PARK	5900	2/25/93	62	21.2	36.2	36.9
CHELAN LAKE BASIN							FREEZEOUT CK. TRAIL	3500	2/26/93	23	7.2	7.3	11.1
LYMAN LAKE PILLOW	5900	3/01/93	---	29.5E	56.7	48.4	HARTS PASS	6500	2/25/93	69	23.4	35.1	36.2
MINERS RIDGE PILLOW	6200	3/01/93	---	28.3S	---	---	HARTS PASS PILLOW	6500	3/01/93	---	23.5E	40.2	34.6
PARK CK RIDGE PILLOW	4600	3/01/93	---	26.1E	47.9	40.6	KLESILKA CAN.	3710	2/23/93	21	6.9	2.8	11.4
RAINY PASS	4780	2/25/93	56	19.2	35.8	33.4	LIGHTNING LAKE CAN.	4000	2/27/93	24	6.8	9.1	11.9
RAINY PASS PILLOW	4780	3/01/93	---	20.8S	39.6	32.7	LYMAN LAKE PILLOW	5900	3/01/93	---	29.5E	56.7	48.4
ENTLAT RIVER							MEADOWS CABIN	1900	2/27/93	16	5.0	.0	6.2
BRIEF	1600	2/22/93	23	6.9	.0	6.9	NEW HOZOMEEN LAKE	2800	2/26/93	26	7.2	4.3	10.9
POPE RIDGE PILLOW	3540	3/01/93	---	11.4S	16.7	16.7	RAINY PASS	4780	2/25/93	56	19.2	35.8	33.4
WENATCHER RIVER							RAINY PASS PILLOW	4780	3/01/93	---	20.8S	39.6	32.7
BERNE-MILL CREEK (d)	3170	2/26/93	53	19.0	16.8	24.7	THUNDER BASIN	4200	2/27/93	39	12.6	17.8	18.5
BLEWETT PASS#2PILLOW	4270	3/01/93	---	11.2S	10.4	17.0	BAKER RIVER						
CHIVAKUM G.S.	2500	2/26/93	25	7.5	5.1	10.7	DOCK BUTTE	3800	2/24/93	74	30.0	43.0	56.1
FISH LAKE PILLOW	3370	3/01/93	---	18.6S	21.0	28.4	EASY PASS	5200	2/24/93	68	29.0	69.0	64.5
LYMAN LAKE PILLOW	5900	3/01/93	---	29.5E	56.7	48.4	JASPER PASS	5400	2/24/93	102	40.0	79.0	75.0
MERRITT	2140	2/26/93	29	10.4	4.1	14.4	MARTEN LAKE	3600	2/24/93	82	31.0	57.0	63.6
MISSION RIDGE	5000	2/23/93	51	14.1	11.6	14.0	MT. BLUM	5800	2/24/93	82	28.0	56.0	55.9
STEVENS PASS PILLOW	4070	3/01/93	---	26.6S	32.6	34.7	ROCKY CREEK	2100	2/24/93	80	29.0	9.0	25.2
STEVENS PASS SAND SD	3700	2/26/93	57	20.3	22.0	31.1	SCHREIBERS MDW	3400	2/24/93	66	26.0	39.0	47.9
TROUGH #2	5310	3/01/93	---	9.0S	7.4	9.0	SF THUNDER CK	2200	2/24/93	18	6.5	.0	7.9
UPPER WHEELER	4400	2/22/93	43	10.9	---	9.4	WATSON LAKES	4500	2/24/93	86	33.0	39.0	53.3
UPPER WHEELER PILLOW	4400	3/01/93	---	11.3S	9.8	12.1	ELWAHA RIVER						
SOQUILCHUCK CREEK							HURRICANE	4500	2/26/93	24	8.6	4.6	17.4
STEMILT CREEK							MORSE CREEK						
STEMILT SLIDE	5000	2/22/93	47	12.1	8.0	12.7	COX VALLEY	4500	2/27/93	50	19.2	26.1	32.4
UPPER WHEELER	4400	2/22/93	43	10.9	---	9.4	DUNGENESS RIVER						
UPPER WHEELER PILLOW	4400	3/01/93	---	11.3S	9.8	12.1	DEER PARK	5200	2/24/93	30	10.5	11.1	17.3
COLOCKUM CREEK							QUILCENE RIVER						
TROUGH #2 PILLOW	5310	3/0											



# CONSERVE YOUR IRRIGATION WATER

Can irrigators use less water and get good yields? We think so. With energy costs on an upward spiral and water shortages likely, we offer these water saving ideas to irrigators.

Consider ditch lining or gated pipe. This will reduce the 10-90% loss which occurs in earth ditches.

Keep ditches clean and free from weeds, sediment or other debris, which can slow water velocity, affect delivery rate, and increase evaporation.

Make sure head gates, drop structures, and pipe inlets are operational. A washed out structure is water lost.

Inspect ditch banks for rodent damage. Rodent holes cause leakage or failures.

Make sure sprinkler nozzles are not worn or leaky. Check pipe connections and valves to prevent leaks.

Operate sprinklers at recommended pressure to effectively use available water.

Maintain your pump at peak efficiency to save energy.

## BETTER WATER MANAGEMENT

Better water management may require more labor. It may require changing a head of water in the middle of the night. But it will be worth it. You should:

Measure your water to determine how much is applied.

Consider alternate row irrigation for crops planted in furrows.

Plan short runs. Match stream size and velocity to soil intake rate and capacity.

Catch and reuse tail water where possible.

Under irrigate the lower end of the field to stretch your water.

When water is short, consider eliminating that last irrigation.

Soil Conservation Service personnel can:

Help plan and design new irrigation systems or evaluate existing ones. Provide technical assistance for land leveling, pipeline installation, and other practices.

## KNOW YOUR SOILS

Soil absorbs irrigation water at a given rate. This varies with each soil type. Some crops require more water than others. Check soil moisture by spade, probe, or moisture meter. Or use the "feel" method.

## WHEN IRRIGATION IS NEEDED SOIL WILL FEEL AND ACT THIS WAY

Soil Texture	A handful of soil will
Coarse	Tend to stick together slightly, but will not form a ball
Medium	Be crumbly, but will form a ball
Fine	be pliable, and will form a ball.

If you have a conservation plan on your farm, or if the soil in your area has been mapped, the Soil Conservation Service can crosscheck soil type and irrigation data and provide you with the water holding capacity of your soil for a given crop.

## RANCHING TIPS FOR WATER-SHORT YEARS

Forage production on range and dry pasture depends entirely on natural moisture. While overgrazing does damage to perennial plants during a season of normal moisture, it is more severe during a drought year. It reduces plant vigor, stops root and leaf growth, reduces ground cover, and invites accelerated erosion. Once erosion begins, it gets worse each year, further reducing plant vigor and forage production. This process is difficult to reverse.

Rather than risk permanent damage to grazing resources start planning a strategy early. For example:

- reduce livestock numbers to balance with forage supply
- cull herds more than normal
- sell calves and lambs early
- determine forage needs and buy needed supplements early
- grow small grains or sorghums for hay or pasture (these use less water than conventional forage crops)
- defer planting perennial pasture, hay or range seedings until a year with more favorable water outlook
- keep spring developments, stock tanks, float valves and pipeline in good working order so water is not wasted
- use evaporation retardant on ponds and tanks
- prepare for hauling stock water
- give spring development high priority (even mediocre springs will be helpful)
- check with local SCS and ASCS offices to learn if cost-share programs are available to help with spring developments or other water conservation practices
- don't overgraze or otherwise disturb streambank vegetation (it will help prevent erosion, reduce sediment, and provide food and cover for wildlife)

Remember, if a unit must be abused, well-established seedings can tolerate overgrazing better than native range.

Wildlife will suffer during a drought as much or more than domestic livestock. The wildlife that share your land is a valuable natural resource.

To help wildlife:

- include features at stock water developments which will allow small animals and birds safe access to water (these are usually not expensive and are easily installed)
- fence ponds and springs and install collector pipes to deliver water to a tank or trough. This will improve water quality and quantity for livestock, as well as provide lush vegetation for small animals and birds.

Other places for information or assistance:

- check with local ASCS office for possible special practices or cost-sharing that might assist with irrigation on your farm or ranch this year.
- maintain contact with Farmers Home Administration for special local programs available.

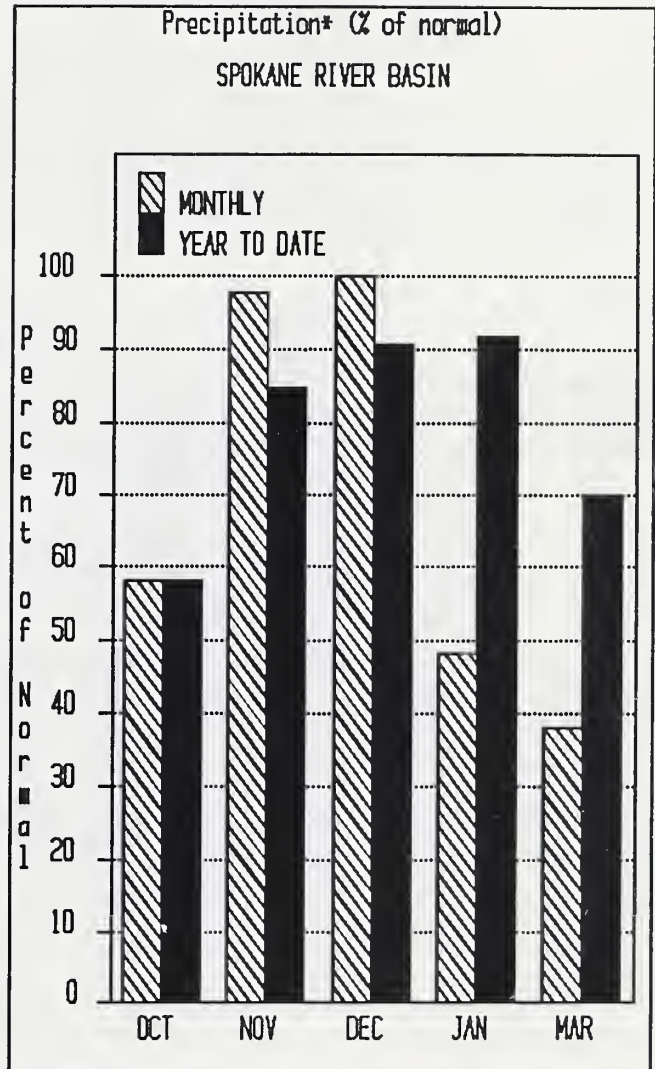
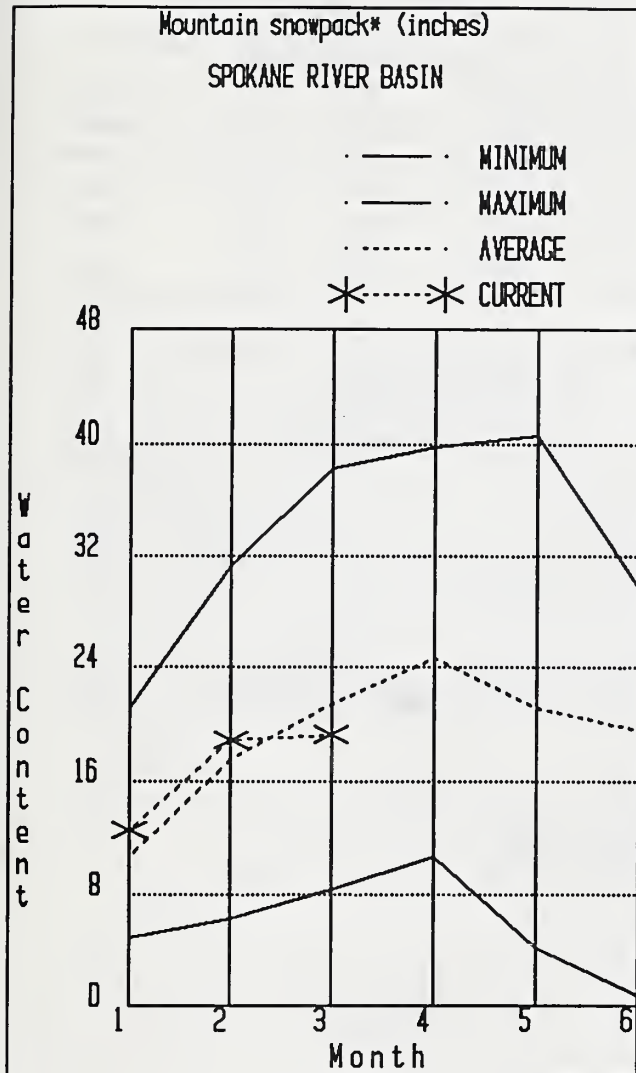
- maintain contact with the local Cooperative Extension Service office for agricultural and marketing conditions.

If you belong to an irrigation district, contact irrigation officials throughout the season to learn about current water availability and water supply forecasts.

For more information concerning your crop, and soil and water conditions, contact the local Conservation District Office.



# Spokane River Basin



\*Based on selected stations

Precipitation for February was 38% of average. The March 1 forecasts for summer runoff within the Spokane River Basin are 71%, down from 82% of normal. The forecast is based on a snowpack that is 90% of average and a water year-to-date precipitation value of 70% of normal. Temperatures in the basin were seven degrees below normal during February. Streamflow on the Spokane River was 36% of average for February. March 1 storage in Coeur d'Alene Lake was 36,600 acre feet, 27% of normal, and 17% of capacity.

# SPOKANE RIVER BASIN

## Streamflow Forecasts - March 1, 1993

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast	Chance Of Exceeding *						
	Period	90%	70%	50% (Most Probable)		30%	10%	30-Yr Avg.
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	(1000AF)
SPOKANE nr Post Falls (1,2)	APR-SEP	910	1540	1940	71	2350	2980	2720
	APR-JUL	875	1480	1870	71	2270	2870	2627
SPOKANE at Long Lake (2)	APR-JUL	975	1650	2090	71	2530	3210	2937

### SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of February

### SPOKANE RIVER BASIN Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
					Spokane River	12	116	90

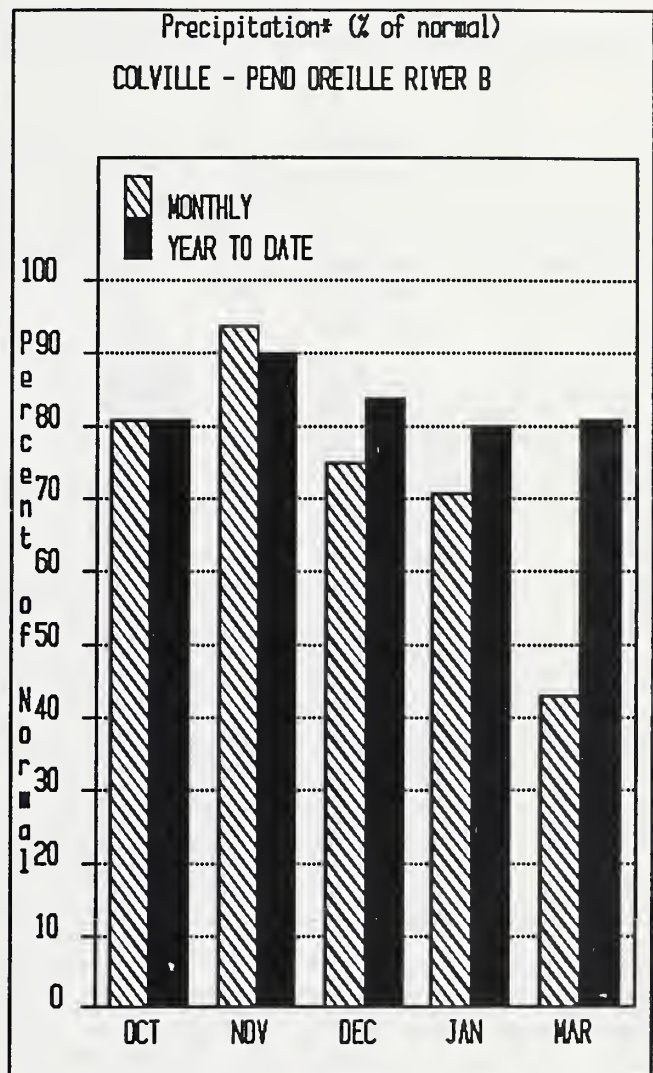
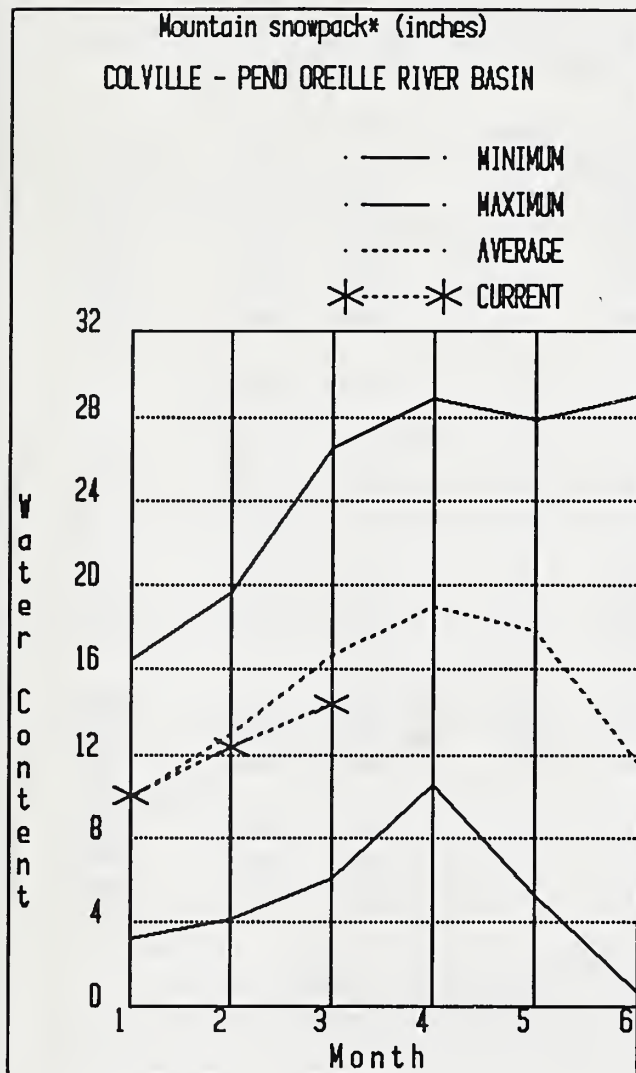
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.



# Colville - Pend Oreille River Basins



\*Based on selected stations

The forecast for the Kettle River streamflow is 84% of normal, the Pend Oreille, 72%, and the Colville River, 81% of normal for the summer runoff period. February streamflow was 40% of normal on the Pend Oreille River, 64% on the Columbia at the International Boundary, and 91% on the Kettle River. March 1 snow cover is 77% of normal, down from 85% of average on the Pend Oreille, 108% of average on the Colville River, and 99% on the Kettle River. Snowpack at Bunchgrass Meadow SNOTEL site was 16.9 inches of water, the average March 1 reading is 21.5. Precipitation during February was 43% of average, bringing the water year-to-date to 81% of normal. Temperatures were four degrees below normal for February.

# COLVILLE - PEND OREILLE RIVER BASINS

## Streamflow Forecasts - March 1, 1993

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast	Chance Of Exceeding *						
	Period	90%	70%	50% (Most Probable)		30%	10%	30-Yr Avg.
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	(1000AF)
-----								
PEND OREILLE bl Box Canyon (1,2)	APR-SEP	7540	9570	10500	71	11400	13500	14590
	APR-JUL	6910	8780	9630	71	10500	12300	13380
	APR-JUN	5990	7600	8330	71	9060	10700	11570
CHAMOKANE CK nr Long Lake	MAY-AUG	1.7	5.3	7.7	81	10.1	13.7	9.4
COLVILLE at Kettle Falls	APR-SEP	67	91	107	81	124	149	131
	APR-JUL	61	83	98	81	113	136	120
	APR-JUN	59	79	92	82	107	128	111
KETTLE nr Laurier	APR-SEP	950	1320	1560	84	1800	2170	1853
	APR-JUL	900	1250	1480	84	1710	2050	1760
	APR-JUN	825	1120	1330	83	1540	1850	1585
COLUMBIA at Birchbank (1,2)	APR-SEP	27300	31600	33600	76	35600	39900	43810
	APR-JUL	22000	25400	27000	76	28600	32000	35140
	APR-JUN	16100	18600	19700	76	20800	23300	25670
COLUMBIA at Grand Coulee Dm (1,2)	APR-SEP	39200	46300	49500	76	52700	59800	64780
	APR-JUL	33200	39100	41800	76	44500	50400	54500
	APR-JUN	26200	30800	32900	76	35000	39600	42730

### COLVILLE - PEND OREILLE RIVER BASINS Reservoir Storage (1000 AF) - End of February

### COLVILLE - PEND OREILLE RIVER BASINS Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROOSEVELT	5232.0	2589.5	4973.7	2763.0	Colville River	2	124	108
BANKS	NO REPORT				Pend Oreille River	8	94	77
					Kettle River	9	116	99

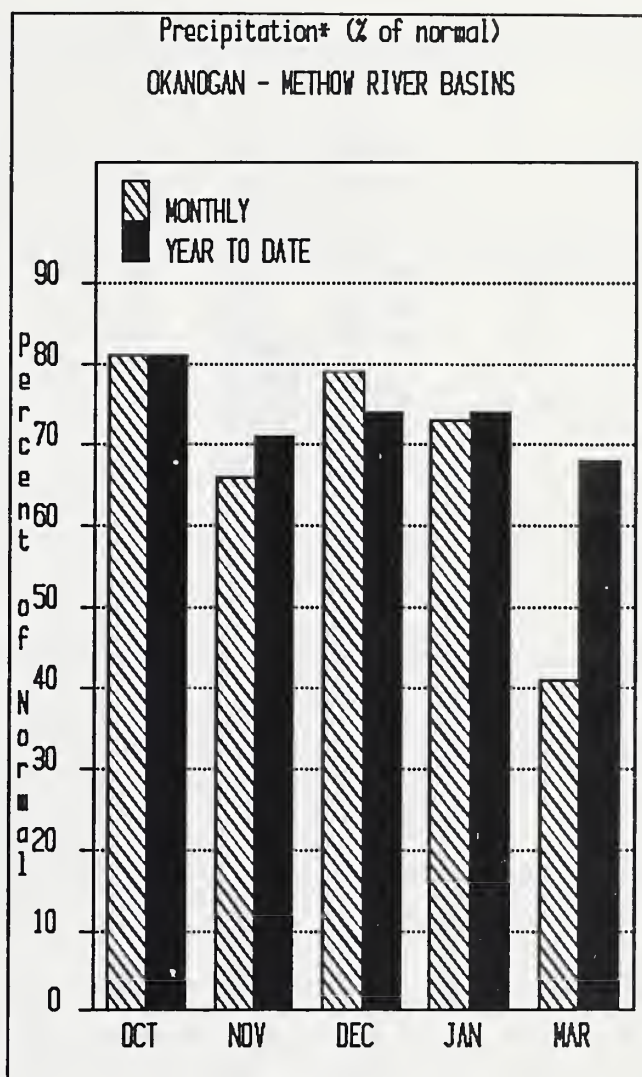
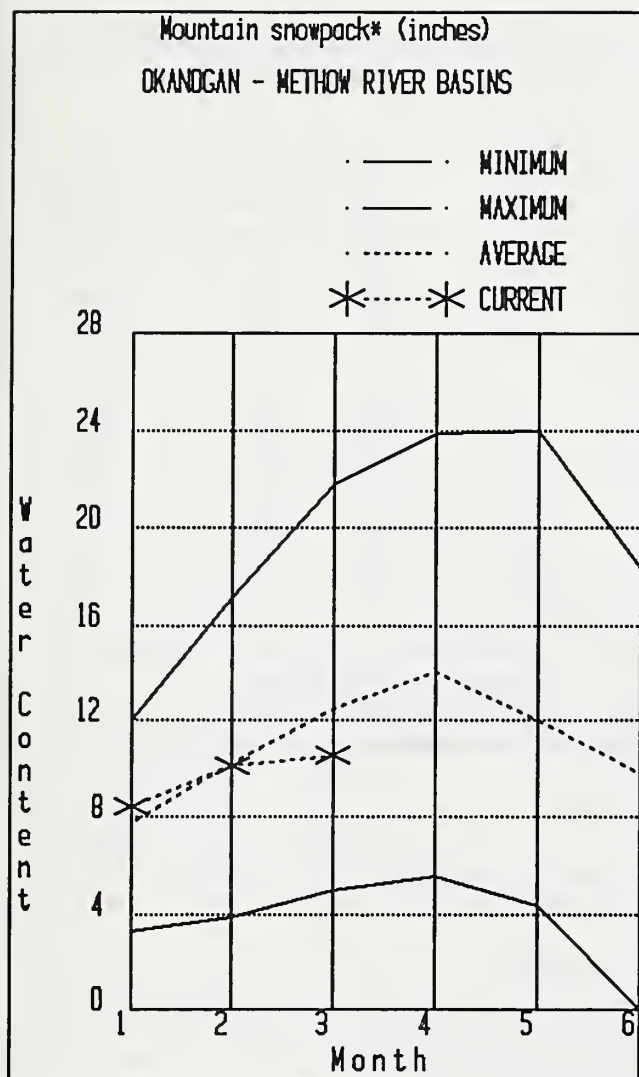
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.



# Okanogan - Methow River Basins



\*Based on selected stations

Summer runoff forecast for the Okanogan River is 67% of normal; the Similkameen River, 59%, and the Methow River, 66% of normal. March 1 snow cover on the Okanogan was 89% of normal, down from 98% of average, 80% on the Methow, and 68% on the Similkameen River. February precipitation in the Okanogan-Methow was 41% of normal, with water year-to-date at 68% of average. February streamflow on the Methow River was 63% of normal, 61% on the Okanogan River, and 55% on the Similkameen. Snow water content at the Harts Pass SNOTEL, elevation 6500 feet, was 23.5 inches; normal for this site is 34.6 inches. Temperatures were four degrees below normal for the month. Storage in the Conconully Reservoir is 12,900 acre feet, which is 55% of capacity and 92% of March 1 average.

# OKANOGAN - METHOW RIVER BASINS

## Streamflow Forecasts - March 1, 1993

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90%	70%	50% (Most Probable)		30%	10%	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
SIMILKAMEEN nr Nighthawk (1)	APR-SEP	435	870	830	59	1080	1230	1399
	APR-JUL	620	815	770	59	1010	1210	1304
	APR-JUN	585	750	670	60	905	1060	1113
OKANOGAN RIVER nr Tonasket (1)	APR-SEP	485	1330	1100	67	1730	1710	1624
	APR-JUL	820	1220	1010	68	1580	1990	1467
	APR-JUN	825	1120	850	68	1380	1670	1234
METHOW RIVER nr Pateros (1)	APR-SEP	365	545	630	66	715	890	942
	APR-JUL	340	505	585	67	660	830	873
	APR-JUN	295	435	510	68	570	710	746

OKANOGAN - METHOW RIVER BASINS  
Reservoir Storage (1000 AF) - End of February

OKANOGAN - METHOW RIVER BASINS  
Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable	*** Usable Storage ***			Watershed	Number	This Year as % of	
	Capacity	This	Last	Avg		of	-----	
		Year	Year			Data Sites	Last Yr	Average
CONCONULLY LAKE (SALMON)	10.5	7.2	8.2	8.0	Okanogan River	29	99	85
CONCONULLY RESERVOIR	13.0	5.7	7.9	6.0	Methow River	4	75	80

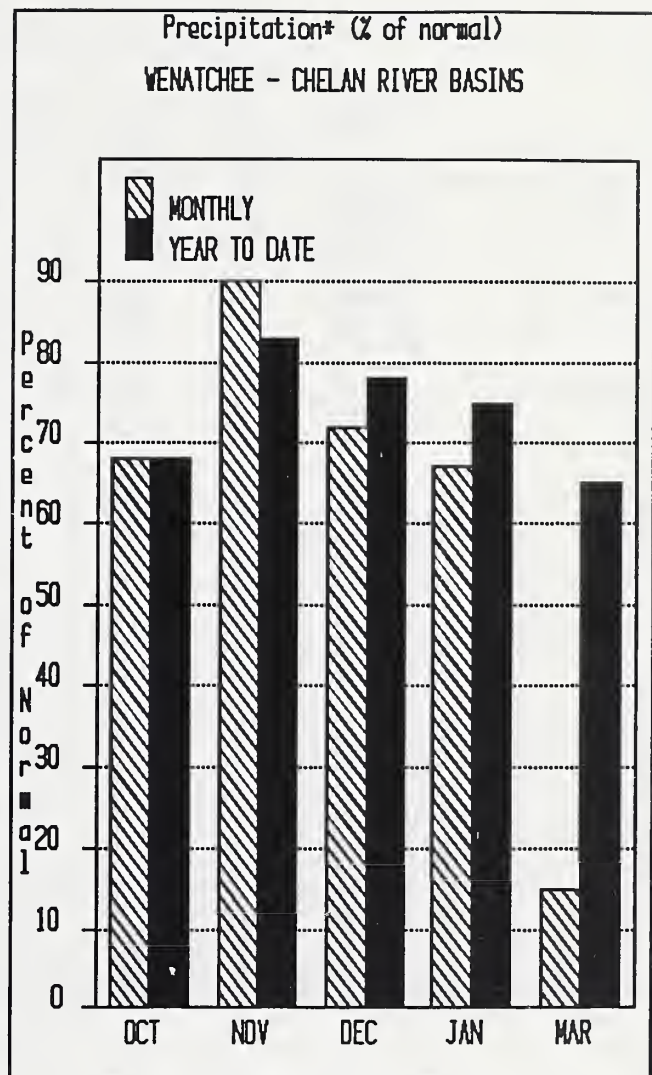
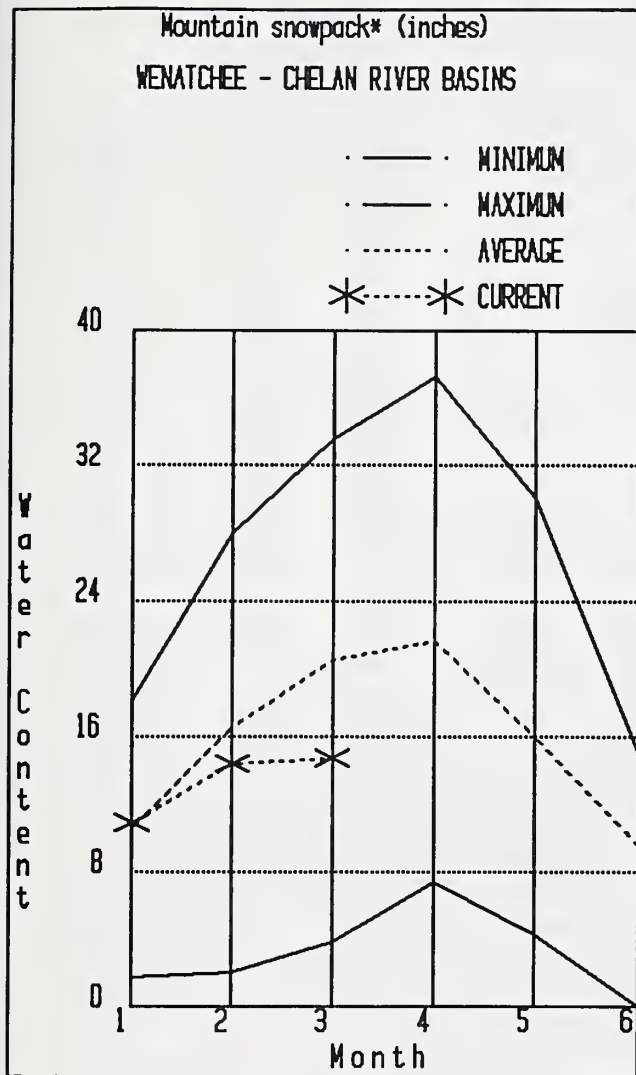
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

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- (2) - The value is natural flow - actual flow may be affected by upstream water management.



# Wenatchee - Chelan River Basins



\*Based on selected stations

Precipitation during February was 15% of normal in the basin and 65% for the year to date. Runoff for the Entiat River is forecast to be 74% of normal for the summer. The summer forecast for the Chelan River is for 70%, for the Wenatchee River it is 67%, and 81% on the Squilchuck-Stemilt. March 1 snowpack in the Wenatchee Basin is 73% of average down from 89% and the Chelan Basin is 63%. Snowpack along Colockum Ridge continues to be near normal for the first time in five years, with Stemilt Creek at 94% but down from 107% last month. Snowpack on the Entiat River is at 78% of average. Reservoir storage in Lake Chelan is 160,500 acre feet or 95% of March 1 average and 24% of capacity. Lyman Lake SNOTEL had the most snow water with 29.5 inches of water, this site would normally have 48.4 inches. Streamflow for February on the Chelan River was 58% of average and on the Wenatchee River it was 59% of normal.

# WENATCHEE - CHELAN RIVER BASINS

## Streamflow Forecasts - March 1, 1993

Forecast Point	Forecast Period	<<----- Drier ----- Future Conditions ----- Wetter ----->>						30-Yr Avg. (1000AF)
		-----		Chance Of Exceeding *		-----		
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
CHELAN RIVER at Chelan (1)	APR-SEP	590	730	820	70	910	1060	1160
	APR-JUL	475	650	730	71	810	985	1024
	APR-JUN	385	525	585	72	645	785	812
STEHEKIN R. at Stehekin	APR-SEP	490	555	600	72	635	705	827
	APR-JUL	420	475	510	72	545	600	701
	APR-JUN	330	370	400	74	430	470	538
ENTIAT RIVER nr Ardenvoir	APR-SEP	124	151	170	74	189	215	227
	APR-JUL	111	137	155	75	173	199	206
	APR-JUN	96	116	130	76	144	164	169
WENATCHEE R. at Peshastin	APR-SEP	540	875	1090	66	1310	1640	1636
	APR-JUL	510	795	990	66	1190	1470	1485
	APR-JUN	425	655	810	67	965	1200	1204
STEMILT nr Wenatchee (miners in)	MAY-SEP	71	97	115	83	133	159	138
ICICLE CREEK nr Leavenworth	APR-SEP	173	245	290	78	340	410	370
	APR-JUL	157	220	265	77	310	375	340
	APR-JUN	124	175	210	77	245	295	270
COLUMBIA R. bl Rock Island Dam (2)	APR-SEP	42100	49000	53600	76	58200	65100	70410
	APR-JUL	35900	41700	45600	76	49500	55300	59690
	APR-JUN	28100	32600	35700	75	38800	43300	46980

## WENATCHEE - CHELAN RIVER BASINS Reservoir Storage (1000 AF) - End of February

## WENATCHEE - CHELAN RIVER BASINS Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
CHELAN LAKE	676.1	160.5	178.6	168.1	Chelan Lake Basin	3	53	63
					Entiat River	2	110	78
					Wenatchee River	11	90	73
					Squilchuck Creek	0	0	0
					Stemilt Creek	2	131	94
					Colockum Creek	1	122	100

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

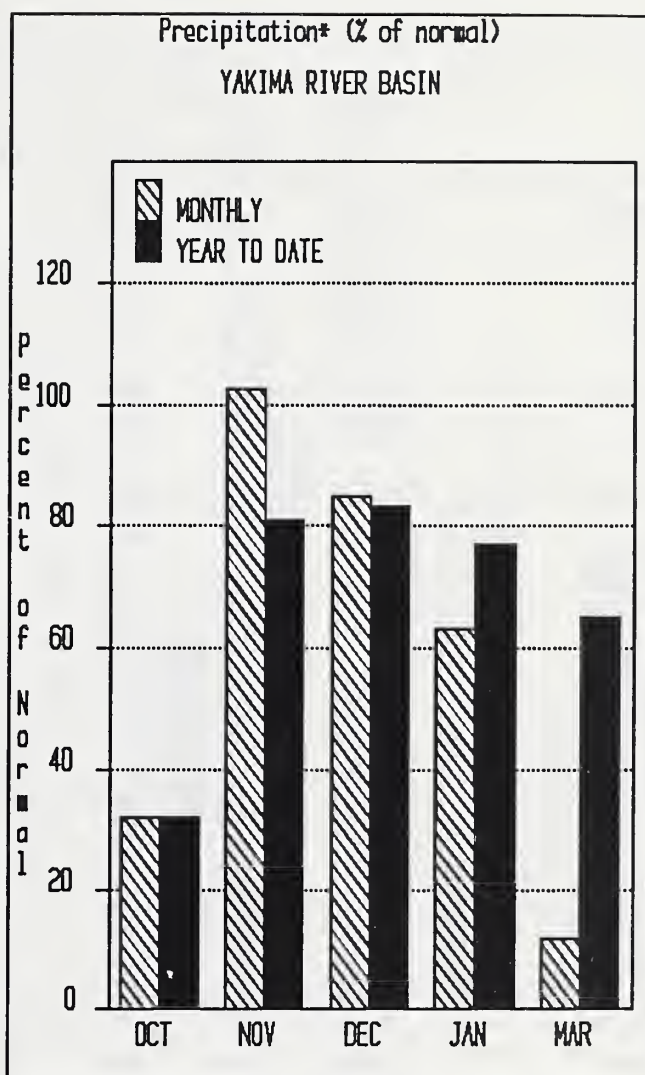
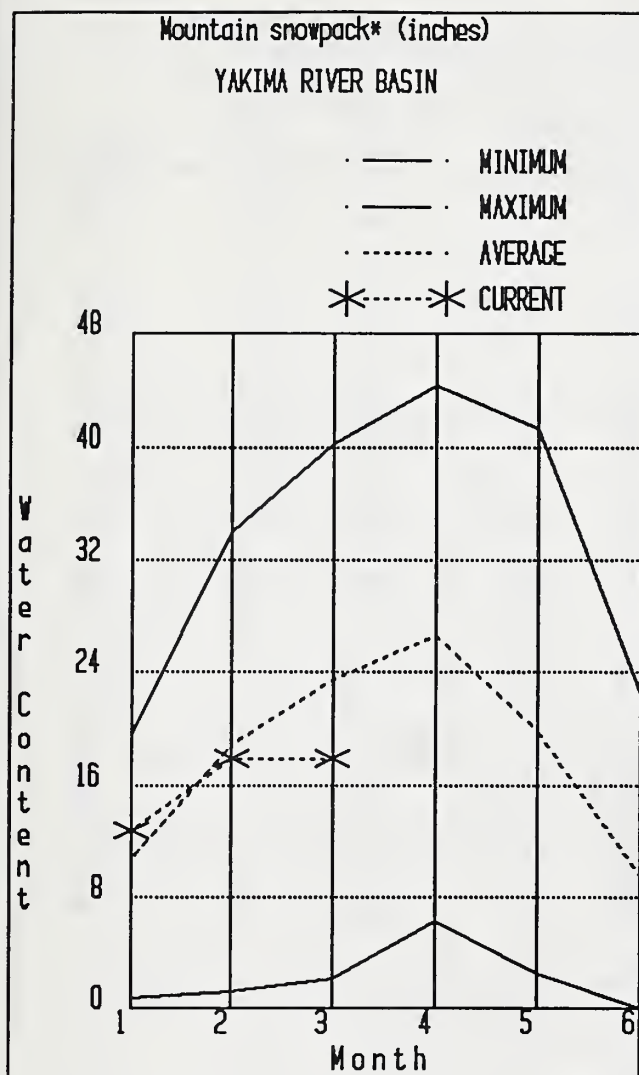
The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



# Yakima River Basin



\*Based on selected stations

February precipitation was 12% of normal and 65% for the water year to date. March 1 reservoir storage for the five major reservoirs at 261,800 acre feet, was 38% of average. Temperatures were eight degrees below average for February. March 1 summer streamflow forecasts for the Yakima Basin vary throughout the basin as follows: The Yakima River at Cle Elum, 70%; Naches River, 72%; the Yakima River at Parker, 67%, Ahtanum Creek, 71%, and the Tieton River 71%. February streamflows were very low, with the Yakima River at Parker 47% of normal, 48% for the Yakima near Cle Elum, and 29% for the Naches River. March 1 snowpack is 76% of average, down from 95% last month. The snowpack is based upon 18 snow courses and SNOTEL readings. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U. S. Bureau of Reclamation's forecast for the total water supply available which includes irrigation return flow.

# YAKIMA RIVER BASIN

## Streamflow Forecasts - March 1, 1993

Forecast Point	Forecast Period	<<----- Drier -----		Future Conditions		----- Wetter ----->>		30-Yr Avg. (1000AF)
		-----		Chance Of Exceeding *		-----		
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
LAKE KEECHELUS INFLOW	APR-JUL	69	80	88	70	96	107	124
	APR-SEP	73	87	96	71	105	119	135
	APR-JUN	63	72	78	71	84	93	109
KACHESS LAKE INFLOW	APR-JUL	62	71	78	70	85	94	111
	APR-SEP	64	75	83	70	91	102	118
	APR-JUN	57	65	70	70	75	83	99
CLE ELUM LAKE INFLOW	APR-JUL	260	285	300	73	315	340	409
	APR-SEP	260	295	315	70	335	370	448
	APR-JUN	215	235	250	72	265	285	345
YAKIMA RIVER at Cle Elum	APR-JUN	440	480	510	70	540	580	721
	APR-JUL	490	545	580	69	615	670	832
	APR-SEP	535	595	640	69	685	745	915
BUMPING LAKE INFLOW	APR-SEP	69	91	100	73	109	131	136
	APR-JUL	71	84	92	74	101	113	124
	APR-JUN	58	70	78	75	86	98	104
AMERICAN RIVER nr Nile	APR-SEP	74	83	89	75	95	104	118
	APR-JUL	68	76	82	75	88	96	109
	APR-JUN	55	64	69	75	75	83	92
RIMROCK LAKE INFLOW	APR-SEP	119	158	170	71	182	220	238
	APR-JUL	121	135	145	72	155	169	200
	APR-JUN	96	109	118	72	127	141	162
NACHES RIVER nr Naches (2)	APR-SEP	410	550	600	72	650	800	832
	APR-JUL	445	505	545	72	585	645	755
	APR-JUN	390	440	475	72	510	560	651
AHTANUM CREEK nr Tampico (2)	APR-SEP	15.0	26	33	71	40	51	46
	APR-JUL	14.0	24	30	71	37	46	42
	APR-JUN	12.0	20	26	72	32	40	36
YAKIMA near Parker	APR-SEP	935	1240	1350	67	1460	1810	1994
	APR-JUL	1010	1140	1230	68	1320	1450	1805
	APR-JUN	925	1030	1100	68	1170	1280	1597

### YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of February

### YAKIMA RIVER BASIN Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
KEECHELUS	157.8	48.5	112.6	105.0	Yakima River	18	105	76
KACHESS	239.0	64.1	165.0	179.0	Ahtanum Creek	2	167	115
CLE ELUM	436.9	83.8	294.0	273.0				
BUMPING LAKE	33.7	5.1	7.4	10.0				
RIMROCK	198.0	60.0	98.8	130.0				

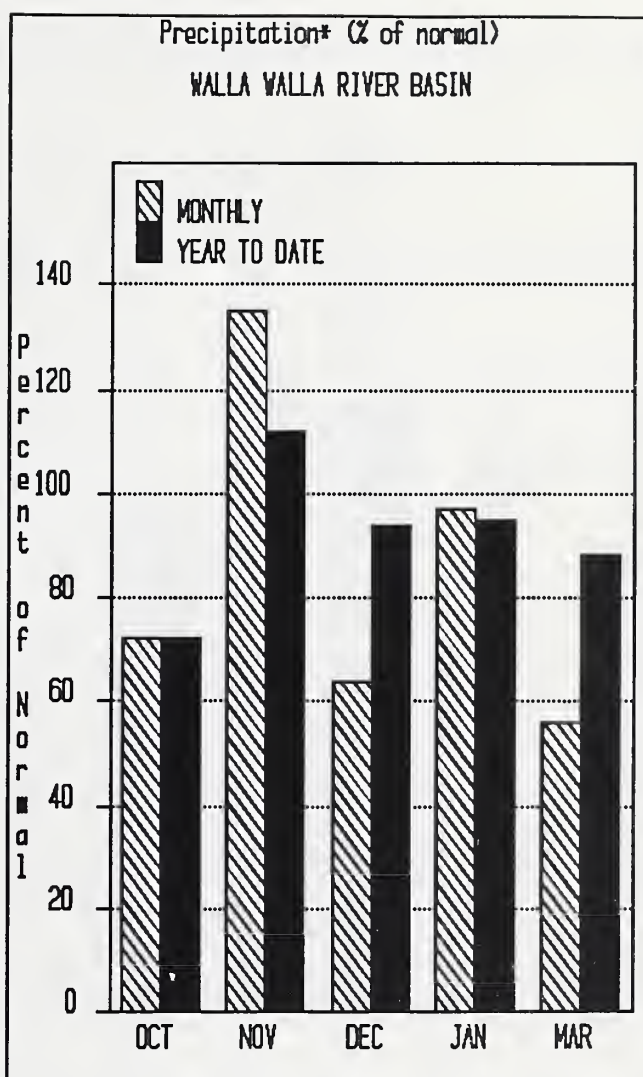
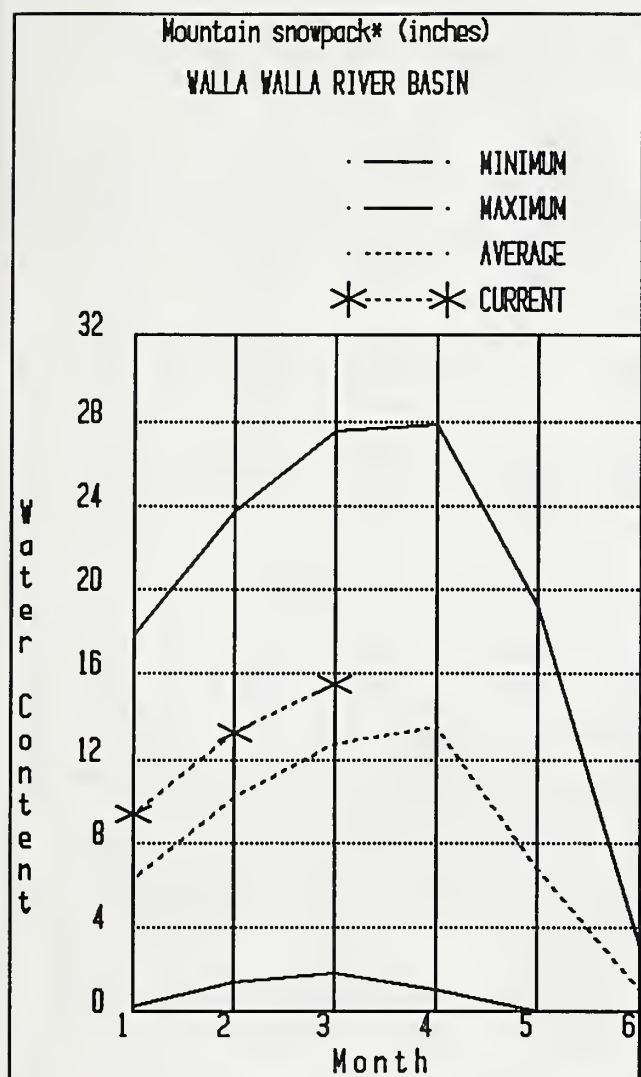
\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.



# Walla Walla River Basin



\*Based on selected stations

The forecast is for 98% of average streamflow in the Walla Walla River for the coming summer, the Grande Ronde, 106%; Snake River, 78%, and 87% for Mill Creek. February streamflow was 21% of normal on the Walla Walla River, 44% for the Snake River, and 32% on the Grande Ronde River near Troy. March 1 snowpack is at 122% of normal. The Touchet SNOTEL site has 27.6 inches of water, the normal March 1 reading for this site is 27.8 inches. February precipitation was 56% of average, bringing the year-to-date precipitation to 88% of normal. Temperatures were 11 degrees below average for February.

# WALLA WALLA RIVER BASIN

## Streamflow Forecasts - March 1, 1993

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						
		90%	70%	50% (Most Probable)		30%	10%	30-Yr Avg.
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	(1000AF)
GRANDE RONDE at Troy (1)	MAR-JUL	1090	1390	1530	104	1670	1970	1471
	APR-SEP	980	1260	1380	105	1500	1780	1312
SNAKE bl Lower Granite Dam (1,2)	APR-JUL	9830	14800	17100	78	19400	24400	21650
	APR-SEP	10900	16500	19100	78	21700	27300	24360
MILL CREEK at Walla Walla	APR-SEP	7.6	12.0	15.0	87	18.0	22	17.1
	APR-JUL	7.5	11.9	14.9	88	17.9	22	16.9
	APR-JUN	7.4	11.8	14.7	88	17.6	22	16.7
SF WALLA WALLA nr Milton Freewater	APR-JUL	42	48	52	98	56	62	53
COLUMBIA R. at The Dalles (2)	APR-SEP	57400	66300	74500	75	83100	92000	98910
	APR-JUL	48900	58200	64500	76	70800	80100	84710
	APR-JUN	39800	47300	52400	76	57500	65000	68890

WALLA WALLA RIVER BASIN  
Reservoir Storage (1000 AF) - End of February

WALLA WALLA RIVER BASIN  
Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					Mill Creek	2	149	106

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

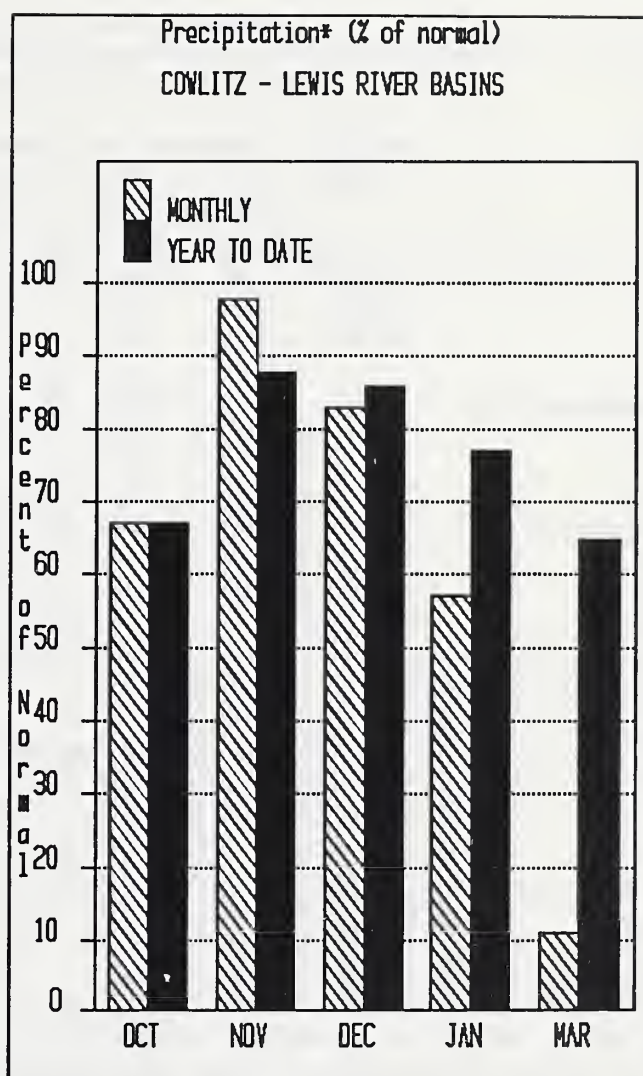
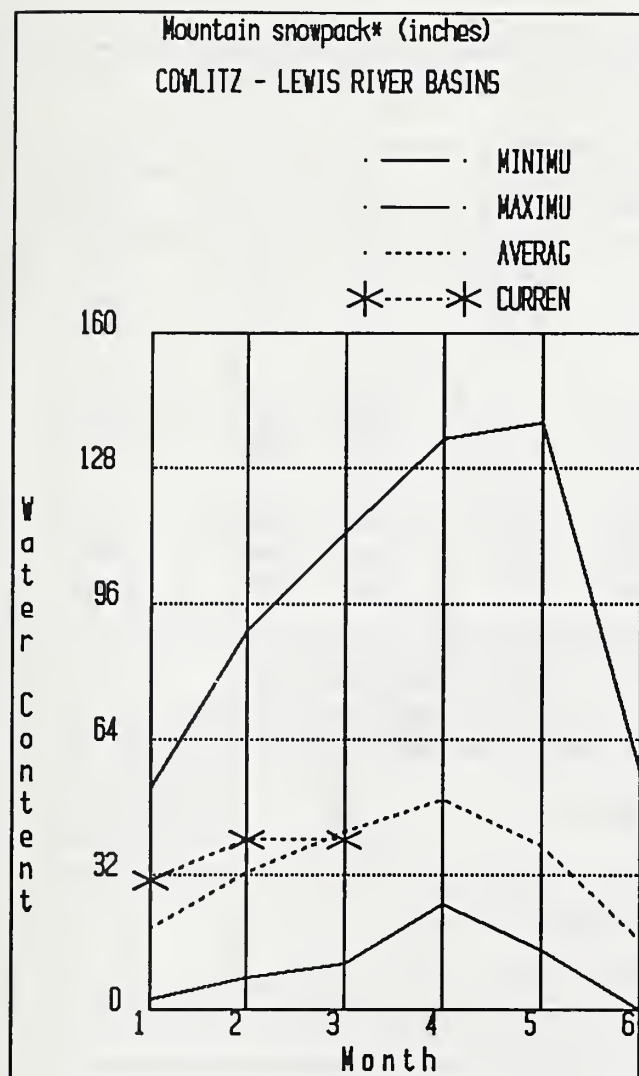
The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



# Cowlitz - Lewis River Basins



\*Based on selected stations

February precipitation was 11% of normal, bringing the water year-to-date precipitation to 65% of average. March 1 snow cover for the Cowlitz River is 91%, and for the Lewis River it is 105%. The forecast for summer runoff in the Lewis River is 83% of normal and the Cowlitz River, 80%. February streamflow on the Cowlitz River was 39% of average, and 28% on the Lewis River. The Paradise Park SNOTEL contained the maximum water content for the basin with 45.2 inches of water. Normal March 1 water content is 47.9 inches. Temperatures were three degrees below normal for February.

# **COWLITZ - LEWIS RIVER BASINS**

## **Streamflow Forecasts - March 1, 1993**

Forecast Point	Forecast Period	<<----- Drier ----- Future Conditions ----- Wetter ----->>						
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)	
LEWIS RIVER at Ariel (2)	APR-SEP	495	860	1010 83	1160	1520	1204	
	APR-JUL	560	750	880 83	1010	1200	1051	
	APR-JUN	495	665	780 83	895	1070	933	
COWLITZ R. bl Mayfield Dam (2)	APR-SEP	610	1290	1580 80	1870	2540	1970	
	APR-JUL	770	1140	1390 80	1640	2010	1731	
	APR-JUN	660	975	1190 80	1400	1720	1477	
COWLITZ R. at Castle Rock (2)	APR-SEP	880	1860	2240 83	2620	3600	2667	
	APR-JUL	1140	1620	1950 83	2280	2760	2325	
	APR-JUN	975	1390	1675 83	1960	2370	1995	

COWLITZ - LEWIS RIVER BASINS  
Reservoir Storage (1000 AF) - End of February

COWLITZ - LEWIS RIVER BASINS  
Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of Last Yr Average	
		This Year	Last Year	Avg				
					Cowlitz River	7	117	91
					Lewis River	4	256	105

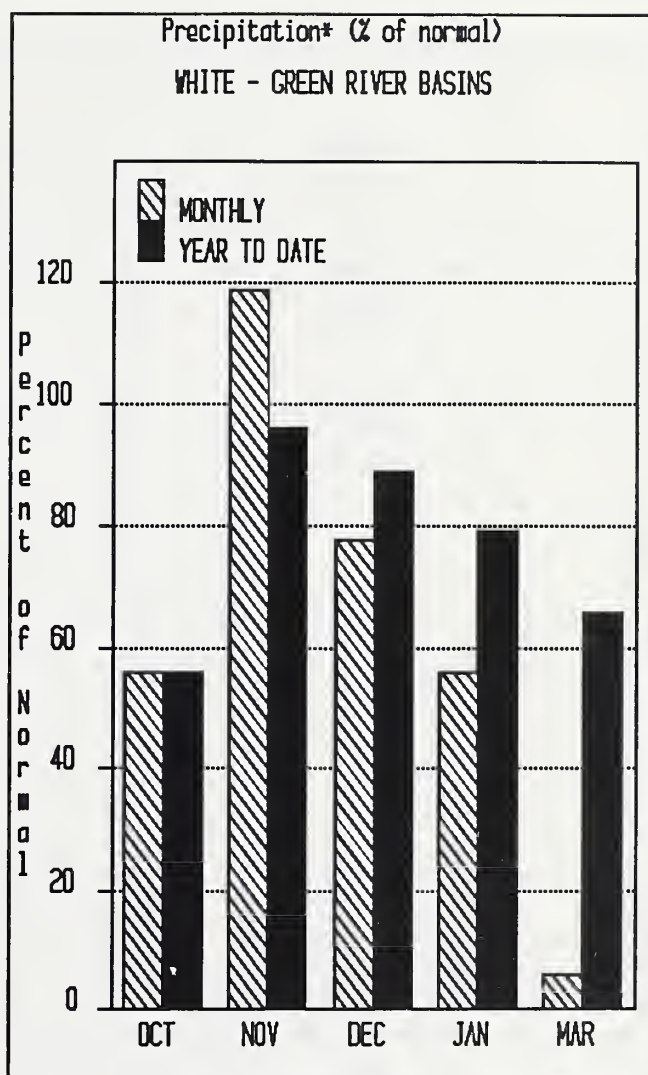
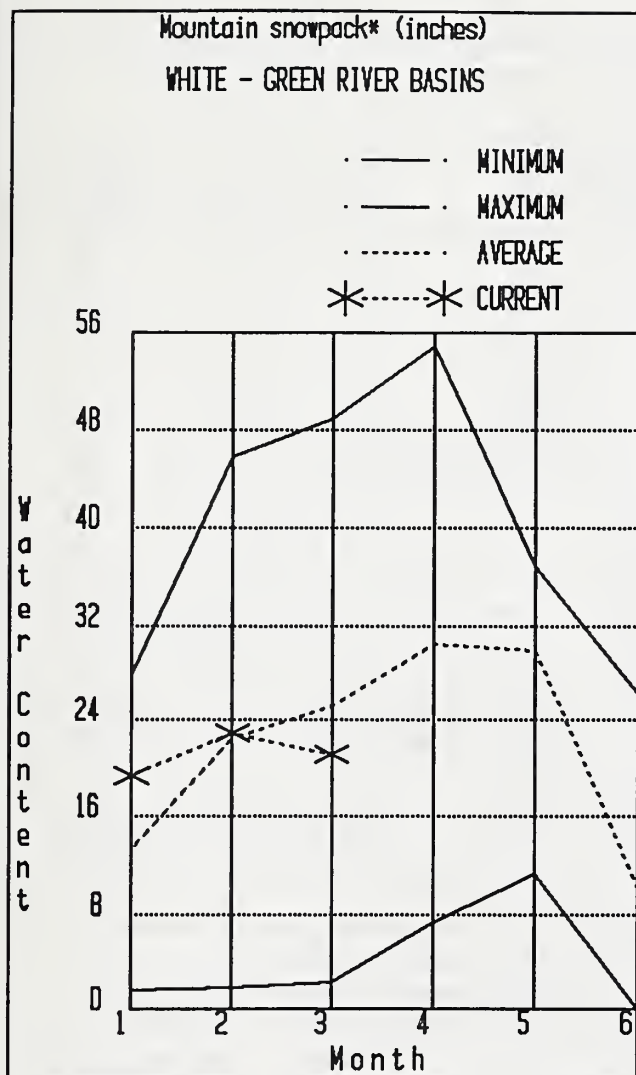
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The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.



# White - Green River Basins



\*Based on selected stations

February precipitation was 6% of normal, bringing the water year to date to 66% of average. Temperatures were one degrees below average for February. Summer runoff is forecasted to be 81% on the Green River and 83% on the Cedar River, the Rex River at 85%, the South Fork of the Tolt River at 78% and the Cedar River at Cedar, 81%. March 1 snowpack was 81% of normal in the White River Basin and 85% in the Green River Basin. Water content on March 1 at the Stampede Pass SNOTEL, at an elevation of 3860 feet, was 29.2 inches. This site has a March 1 average of 38.2 inches.

# WHITE - GREEN RIVER BASINS

## Streamflow Forecasts - March 1, 1993

		<<----- Drier ----- Future Conditions ----- Wetter ----->>							
Forecast Point	Forecast Period	Chance Of Exceeding *							
		90%	70%	50% (Most Probable)		30%	10%	30-Yr Avg.	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	(1000AF)	
GREEN RIVER below Howard Hanson Dam		APR-JUL	177	197	210	81	225	245	257
		APR-SEP	191	215	230	80	245	270	285
		APR-JUN	161	178	190	81	200	220	234
CEDAR RIVER near Cedar Falls		APR-JUL	53	60	64	83	69	75	77
		APR-SEP	58	65	70	82	75	82	85
		APR-JUN	47	53	57	83	61	67	68
REX RIVER nr Cedar Falls		APR-JUL	17.0	21	23	85	25	29	27
		APR-SEP	20	23	26	85	28	31	30
REX RIVER near Cedar Falls		APR-JUN	16.0	19.0	21	85	23	26	25
CEDAR RIVER at Cedar Falls		APR-JUL	45	58	67	81	76	89	82
		APR-SEP	46	59	68	81	77	90	83
		APR-JUN	45	58	67	83	76	89	80
SOUTH FORK TOLT RIVER near Index		APR-JUL	9.5	11.0	12.0	78	13.0	14.5	15.2
		APR-SEP	11.3	13.2	14.6	82	16.0	17.9	17.8
		APR-JUN	8.4	9.8	10.8	82	11.8	13.2	13.1

### WHITE - GREEN RIVER BASINS Reservoir Storage (1000 AF) - End of February

### WHITE - GREEN RIVER BASINS Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of -----	
		This Year	Last Year	Avg			Last Yr	Average
					White River	3	88	81
					Green River	7	168	85
					Cedar River	2	0	91

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

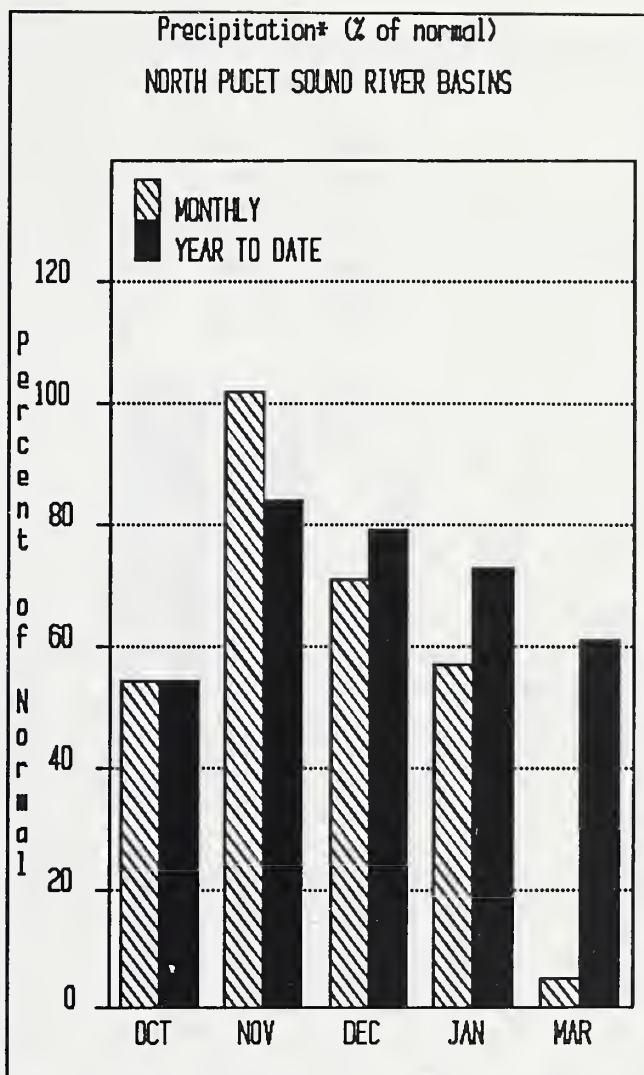
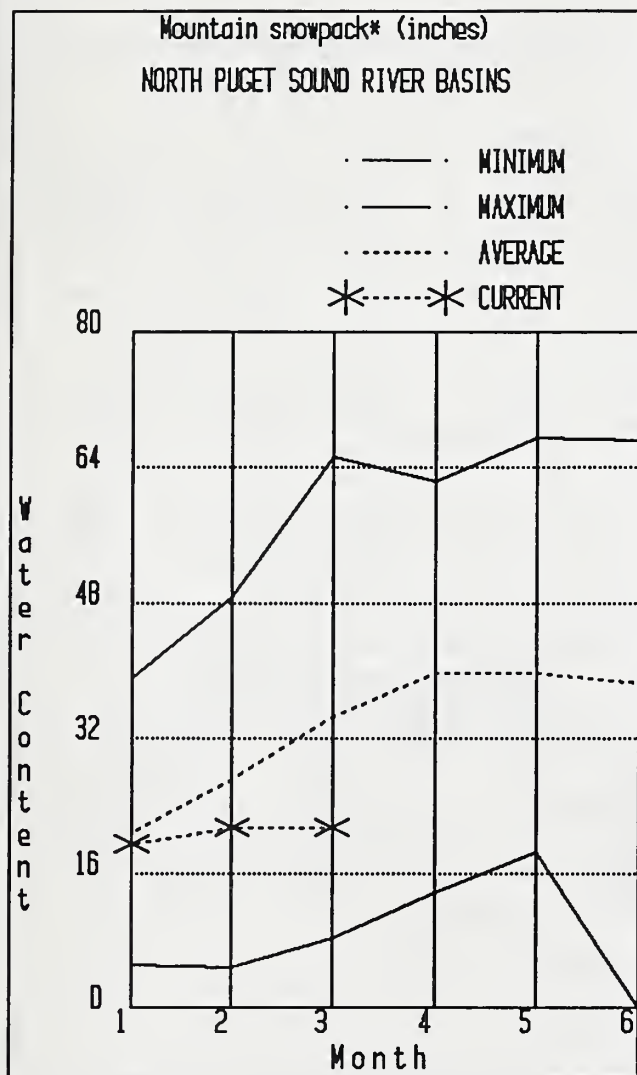
The average is computed for the 1961-1990 base period.

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# North Puget Sound River Basins



\*Based on selected stations

Precipitation for February was 5% of average with a water year to date at 61% of normal. March 1 snow cover in the Skagit River was 64% of normal, and on the Baker River it was 56%. February streamflow in the Skagit River was 62% of average. Forecast for the Skagit River streamflow is 74% of normal for the spring and summer period. Other forecast points include the Baker River at 76% and Thunder Creek at 80%. Rainy Pass SNOTEL at elevation 4780 feet, had 20.8 inches of water content; normal March 1 water content is 32.7 inches. March 1 reservoir storage was above average, with Ross Lake reservoir at 195% of normal and 43% of capacity. February temperatures were two degrees below normal.

# NORTH PUGET SOUND RIVER BASINS

## Streamflow Forecasts - March 1, 1993

		<<----- Drier -----		Future Conditions -----		Wetter ----->>			
Forecast Point	Forecast	----- Chance Of Exceeding * -----							
	Period	90%	70%	50% (Most Probable)		30%	10%	30-Yr Avg.	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	(1000AF)	
THUNDER CREEK near Newhalem	APR-JUL	159	174	184	80	194	210	230	
	APR-SEP	235	250	260	79	270	285	328	
	APR-JUN	92	109	120	80	132	148	149	
SKAGIT RIVER at Newhalem (2)	APR-SEP	1160	1440	1630	74	1820	2100	2185	
	APR-JUL	995	1230	1390	75	1550	1780	1830	
	APR-JUN	730	910	1030	73	1150	1330	1410	
BAKER RIVER near Concrete	APR-JUL	515	590	640	76	690	765	836	
	APR-SEP	675	760	820	77	880	965	1064	
	APR-JUN	380	435	475	77	515	570	611	

NORTH PUGET SOUND RIVER BASINS  
Reservoir Storage (1000 AF) - End of February

NORTH PUGET SOUND RIVER BASINS  
Watershed Snowpack Analysis - March 1, 1993

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROSS	1404.1	607.0	834.2	307.6	Snohomish River	6	116	73
DIABLO RESERVOIR	90.6	87.1	87.5	---	Skagit River	13	71	64
GORGE RESERVOIR		NO REPORT			Baker River	9	65	56

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

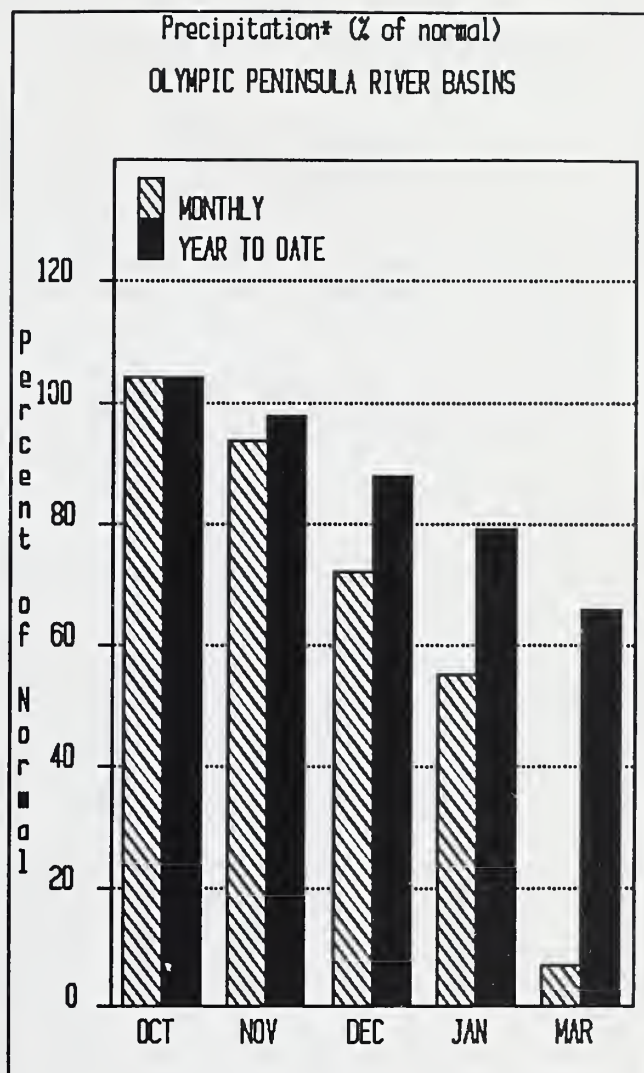
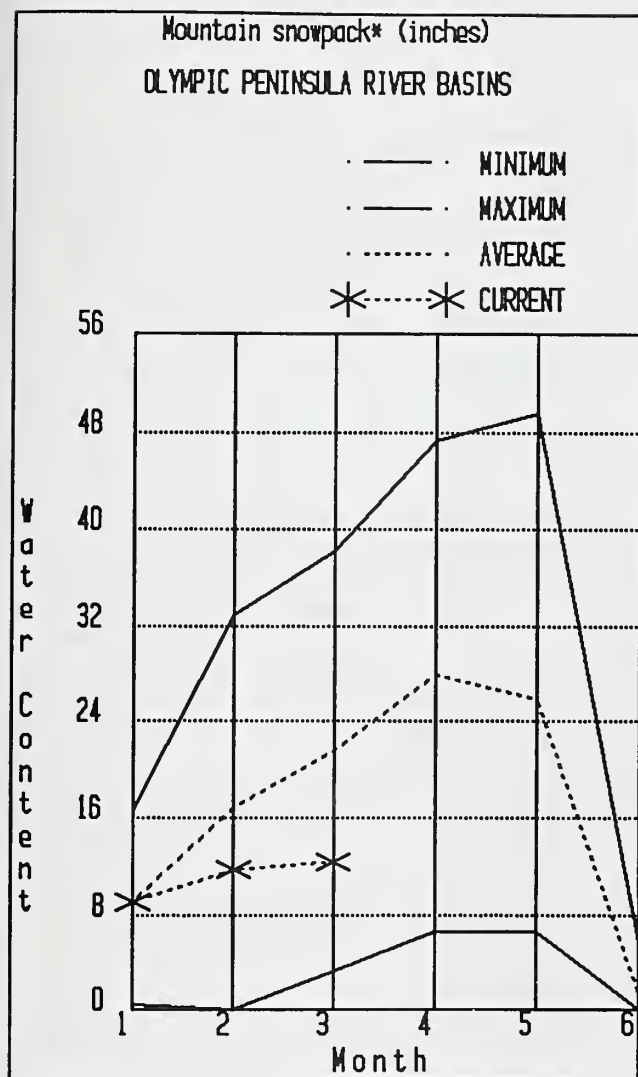
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# Olympic Peninsula River Basins



\*Based on selected stations

February precipitation was 7% of average, with water year-to-date precipitation accumulation at 66% of normal. February precipitation at Quillayute was .87 inches, normal for the month is 12.01 inches. March 1 snow cover in the Olympic Basin is below normal, with the Elwah at 49% of average and the Dungeness at 61%. March forecasts of runoff for streamflow in the basin are for 75% of average on the Dungeness River and the Elwha River. The Big Quilcene can expect below normal runoff this summer. The Mount Crag SNOTEL near Quilcene had 19.9 inches on March 1, last year it had 16.4 inches. Temperatures were one degree below normal for February.

# OLYMPIC PENINSULA RIVER BASINS

## Streamflow Forecasts - March 1, 1993

Forecast Point	Forecast Period	<<----- Drier ----- Future Conditions ----- Wetter ----->>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90%	70%	50% (Most Probable)		30%	10%	
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
DUNGENESS RIVER nr Sequim	APR-SEP	92	109	120	75	132	148	160
	APR-JUL	75	89	98	74	107	121	131
	APR-JUN	57	67	74	75	81	91	98
ELWHA RIVER nr Port Angeles	APR-SEP	280	340	380	75	420	480	502
	APR-JUL	235	285	318	76	350	400	417

OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of February					OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - March 1, 1993			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					Elwha River	1	187	49
					Morse Creek	1	74	59
					Dungeness River	1	95	61
					Quilcene River	0	0	0
					Wynoochee River	0	0	0

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

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In addition to basin outlook reports, a Water Supply Forecast for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

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*Issued by*

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## The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

**Canada:** Ministry of the Environment, Water  
Investigations Branch, Victoria, British Columbia

**States:** Washington State Department of Ecology  
Washington State Department of Natural Resources

**Federal:** Department of the Army  
Corps of Engineers  
U.S. Department of Agriculture  
Forest Service  
U.S. Department of Commerce  
NOAA, National Weather Service  
U.S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service  
Bureau of Indian Affairs

**Local:** City of Tacoma  
City of Seattle  
Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company  
Snohomish County P.U.D.  
Colville Confederated Tribes  
Spokane County  
Yakima Indian Nation

**Private:** Okanogan Irrigation District  
Wenatchee Heights Irrigation District  
Newman Lake Homeowners Association

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.





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SOIL CONSERVATION SERVICE

# Washington Basin Outlook Report

Soil Conservation Service  
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